63D CONGRESS, 2d Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 1144.

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RIO GRANDE, N. MEX.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT ON PRELIMINARY EXAMINATION OF THE RIO GRANDE FROM VELARDE, N. MEX., TO THE SIXTH STANDARD PARALLEL SOUTH, NEW MEXICO MERIDIAN

AUGUST 8, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed.

WAR DEPARTMENT,
Washington, August 7, 1914.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated August 6, together with copy of a report from Lieut. Col. C. S. Riché, Corps of Engineers, dated May 23, 1914, of a preliminary examination made by him in compliance with the provisions of the river and harbor act of July 25, 1912, of the Rio Grande, N. Mex.

Very respectfully,

LINDLEY M. GARRISON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, August 6, 1914.

From: The Chief of Engineers, United States Army.
To: The Secretary of War.
Subject: Preliminary examination of the Rio Grande, N. Mex.

1. There is submitted herewith, for transmission to Congress, report dated May 23, 1914, by Lieut. Col. C. S. Riché, Corps of Engineers, on preliminary examination of Rio Grande River from Velarde, N. Mex., to the sixth standard parallel south, New Mexico meridian, called for by the river and harbor act approved July 25, 1912.

2. The total length of the river covered by the examination is about 348 miles measured along its general course, or about 500 miles following the windings of the channel. Agriculture is carried on by irrigation, and the stream is of more value for this purpose than for navigation. There is no navigation on the river at present, except floating of timber in the upper reaches above the White Rock Canyon, and the district officer states that it is very doubtful if it can be made navigable by open-channel methods even with an assured water supply. Slackwater improvement is deemed impracticable. Prevention of floods on certain sections appears to be the most urgent need at the present time, and this need will apparently be met by the construction of additional reservoirs required for irrigation purposes. The district officer is of opinion that the river is not worthy of improvement for navigation, and the division engineer concurs in this opinion.

3. This report has been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated July 14, 1914, concurring in the views of the district officer and the division engineer.

4. After due consideration of the above-mentioned reports, I concur with the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors, and therefore report that the improvement by the United States of the Rio Grande from Velarde, N. Mex., to the sixth standard parallel south, New Mexico meridian, is not deemed advisable at the present time.

DAN C. KINGMAN,
Chief of Engineers, U. S. Army.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
July 14, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The following is submitted in review of the district officer's report on preliminary examination of the Rio Grande from Velarde, N. Mex., to the sixth standard parallel south New Mexico meridian, called for by the act of July 25, 1912.

2. The total length of the reach under consideration measured along its general course is about 348 miles, but if the windings of the channel are followed it is nearly 500 miles. This distance is variable, as the river changes its course frequently.

3. The river is divided into several natural valleys or basins by cross divides, through which the river has cut canyons. Through the canyons there are many rapids and bowlders, and the current is swift. In the basins the banks are very low, and during floods the stream is erratic and frequently changes its course. From White Rock Canyon south the river is nearly dry during the late summer and early fall, due to the diversion of its waters for irrigation. The general slope is about $3\frac{1}{3}$ to 5 feet per mile below the White Rock Canyon and 10 feet per mile above that point. The bridges are all fixed and have very little headroom.

4. Agriculture is carried on by irrigation, and the stream is of more value for this purpose than for navigation. There is no commerce on the river except the floating of timber in the upper reaches. The district officer states that it is doubtful if the stream can be made navigable by open-channel methods or even by slack water, on account of low banks and lack of suitable foundations. He is of opinion that the river is unworthy of improvement for navigation, and in this view the division engineer concurs.

5. Interested parties were advised of the unfavorable report of the district officer and given an opportunity of submitting their views to the board, but no communications on the subject have been received.

6. The waters of this stream are required for irrigation, and it appears that the full low-water flow is utilized for this purpose. There is not sufficient water for both irrigation and navigation. Moreover, the physical conditions are such as to render improvement for navigation impracticable at reasonable cost. The board therefore reports, in concurrence with the views of the district officer and the division engineer, that it is not advisable for the United States to undertake the improvement of the Rio Grande, N. Mex., in the interests of navigation.

7. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other related subjects having any material bearing upon the improvement of navigation at this locality.

For the board:

W. M. BLACK,
Colonel, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION OF THE RIO GRANDE, N. MEX.

UNITED STATES ENGINEER OFFICE,
Galveston, Tex., May 23, 1914.

From: The District Engineer Officer.
To: Chief of Engineers, United States Army
(Through the Division Engineer).
Subject: Preliminary examination of the Rio Grande, N. Mex.

1. In compliance with instructions contained in circular letter from the office of the Chief of Engineers, dated August 3, 1912, I submit a report on examination of the Rio Grande from Velarde, N. Mex., to the sixth standard parallel south New Mexico meridian, which was ordered by the river and harbor act of July 25, 1912.

2. The field examination was made between April 20 and May 6, by N. T. Blackburn, assistant engineer, from this office, to whose report,[1] with its accompanying illustrations, attention is invited for detailed description.

3. The total length of river examined is about 348 miles, measured along its general course, but this would be increased to nearly 500 miles if the windings of the channel are followed. The river changes its course constantly and this distance is variable. The

[1] Not printed.

general valley of the stream is divided into seven basins or irrigated valleys by cross divides, through which the river has cut canyons. Through the canyons the river is well confined by rocky banks to one regular channel from 200 to 400 feet wide, but is full of rapids and bowlders, and the current is very swift. In the valleys below Domingo the banks are so low (from nothing to 3 or 4 feet) and are composed of such easily eroded alluvium that the river cuts its banks badly and becomes very wide in places and runs in a number of shallow channels. During floods it becomes very erratic and is liable to change its course entirely on the least provocation. The general width in the valleys is 200 to 500 feet, but in places this becomes one-half or three-fourths of a mile. Above Domingo, the river banks are composed of gravel and rock and the stream is more stable. The channel depth at ordinary stage is from 6 inches to 5 or 6 feet, with deeper holes in places. The range between low and high water is $2\frac{1}{2}$ to 5 feet in the valley and 5 to 15 feet or more in the canyons. Floods occur during May and June, when the snow is melting on the mountains at the headwaters. From Velarde to the lower end of the White Rock Canyon the stream is perennial, but from this point south it is nearly or quite dry during the late summer and early fall. This is principally due to diversion of water for irrigation. Due to the friable nature of its bed and banks, the river is extremely muddy. The discharge, from records of rating station, is from 350 to 15,600 cubic feet per second above the White Rock Canyon and from nothing to 33,000 cubic feet per second in the central part at San Marcial, with about the same variation in the lower valley. The general slope is about $3\frac{1}{3}$ to 5 feet per mile below the White Rock Canyon and 10 feet per mile above that point.

4. Obstructions to navigation are rocks, rapids, sharp bends, bridges, and dams. The bridges are all fixed spans and have very little headroom, barely enough in most cases to allow the passage of a skiff. There are five railroad bridges, one combined highway and railroad, and about eight highway bridges. One dam is in place and another is being constructed.

5. All agriculture is by irrigation and is confined to the valleys above mentioned. Water is diverted from the river. The products are alfalfa, hay, wheat, corn, red pepper, fruits, such as apples, peaches, pears, cherries, plums, grapes, and all kinds of vegetables. Cattle, sheep, and horses are raised in the valleys and on the adjoining prairie lands, and a large amount of wool is exported. All products are shipped out and merchandise shipped in by rail. I have been able to get very few commercial statistics. In the valleys of the stretch of river examined there is said to be about 259,000 acres of irrigable land, which would be benefited by improvement of the river. Of this amount only about 142,000 is in cultivation at present.

6. The river is paralleled more or less closely by the Atchison, Topeka & Santa Fe and the Denver & Rio Grande Railroads, and the New Mexico Central Railroad enters the valley at Albuquerque. There are cross lines and branches of the Santa Fe Railroad at various points, and its main transcontinental line crosses the river just below Albuquerque.

7. Population of the valleys over the length examined is estimated at from 73,000 to 80,000, largely Mexican, with a good many Pueblo Indians in the upper portion. In the large towns the white element

predominates and in the other parts is becoming larger as time goes on and irrigation is placed on a firmer basis.

8. There is no navigation on the river at present, except floating of timber in the upper reaches above the White Rock Canyon. It is very doubtful if it can be made navigable by open channel methods, even with an assured water supply. Slack-watering of the river is also impracticable on account of lack of banks to retain pools and lack of suitable foundations for locks and dams, except in the canyons. The construction of a lateral canal is impracticable for the same reason. The inhabitants of the valley show no interest whatever in navigation. Their sole interest in the river is for irrigation, and regulation is important only so far as to control the flood waters and benefit the adjacent land. The most urgent need for regulations of the river is from Velarde to San Marcial. From San Marcial to Elephant Butte the river bed will, within a year, be covered by the reservoir formed by the dam now being built at the latter place by the United States Reclamation Service. This reservoir, it is estimated, will care for two years' inflow of the Rio Grande. For this reason the spillway will seldom overflow and floods will be so thoroughly controlled in the valley below that it is expected there will be very little further need of bank protection. From Velarde to San Marcial the State, various counties, and local parties have spent a large amount of money on the construction of pile, brush, and rock spur dikes and earth levees for the control of the river at critical points, and it is said that the financial burden of this work is too heavy for them to carry unaided.

9. There are no wharves or other terminal facilities at any point along the stream and none are needed. Water power for industrial and commercial purposes can be developed by dams constructed in the canyons in conjunction with irrigation, but the lack of a steady water supply would probably prevent any profitable water power development otherwise.

10. In conclusion, I am constrained to report that so far as navigation is concerned the Rio Grande from Velarde to the sixth standard parallel south, New Mexico meridian, is unworthy of improvement by the General Government. The water of the river is of too much value for domestic use and for irrigation for any of it to be used for other purposes. The full use of the river for irrigation will require additional storage reservoirs and their construction will probably obviate any necessity for flood protection. As the construction of such reservoirs is believed to be under the jurisdiction of the Reclamation Service and not under that of the Engineer Department, the subject of flood control is not more fully reported on here.

INCLOSURES.[1]

11. There is inclosed a letter from the State engineer of New Mexico, giving various statistics, a letter from Bond & Nohl, of Espanola, N. Mex., giving commercial statistics for the Espanola Valley, the report of Assistant Engineer Blackburn, and a sketch map of the section of the river examined.

C. S. RICHÉ,
Lieut. Col., Corps of Engineers.

[1] Not printed.

[First indorsement.]

OFFICE OF DIVISION ENGINEER, GULF DIVISION,
Baltimore, Md., June 6, 1914.

To the CHIEF OF ENGINEERS:

Forwarded, concurring in the opinion of the district officer that the portion of the Rio Grande named is not at this time worthy of improvement by the United States in the interests of navigation.

LANSING H. BEACH,
Colonel, Corps of Engineers,
Division Engineer.

[For report of the Board of Engineers for Rivers and Harbors see page 2.]